

SEQUENCE LISTING

<110> Forschungszentrum Borstel

<120> Antisense oligonucleotides for treatment of  
proliferating cells

<130> P50303

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<141> 2001-02-26

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<160> 3

<170> PatentIn Vers. 2.0

<210> 1

<211> 12493

<212> DNA

<213> Homo sapiens

<220>

<221> CDS

<222> (197)..(9964)

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Phe Gly Arg Gly Ile Glu Cys Asp Ile Arg Ile Gln Leu Pro Val Val

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640 645 650

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1245 1250 1255 1260

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1790 1795 1800

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1805 1810 1815 1820

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1825 1830 1835

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1840 1845 1850

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1855 1860 1865

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1870 1875 1880

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1885 1890 1895 1900

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1905 1910 1915

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1920 1925 1930

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1935 1940 1945

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Lys Ala Leu Glu Asp Leu Ala Gly Phe Lys Glu Leu Phe Gln Thr Pro  
1950 1955 1960

ggt cac act gag gaa tca atg acc gat gac aaa atc aca gaa gta tcc 6136  
Gly His Thr Glu Glu Ser Met Thr Asp Asp Lys Ile Thr Glu Val Ser  
1965 1970 1975 1980

tgc aaa tct cca caa cca gac cca gtc aaa acc cca aca agc tcc aag 6184  
Cys Lys Ser Pro Gln Pro Asp Pro Val Lys Thr Pro Thr Ser Ser Lys  
1985 1990 1995

caa cga ctc aag ata tcc ttg ggg aaa gta ggt gtg aaa gaa gag gtc 6232  
Gln Arg Leu Lys Ile Ser Leu Gly Lys Val Gly Val Lys Glu Glu Val  
2000 2005 2010

cta cca gtc ggc aag ctc aca cag acg tca ggg aag acc aca cag aca 6280  
Leu Pro Val Gly Lys Leu Thr Gln Thr Ser Gly Lys Thr Thr Gln Thr  
2015 2020 2025

cac aga gag aca gca gga gat gga aag agc atc aaa gcg ttt aag gaa 6328  
His Arg Glu Thr Ala Gly Asp Gly Lys Ser Ile Lys Ala Phe Lys Glu  
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tct gca aag cag atg ctg gac cca gca aac tat gga act ggg atg gag 6376  
Ser Ala Lys Gln Met Leu Asp Pro Ala Asn Tyr Gly Thr Gly Met Glu  
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agg tgg cca aga aca cct aag gaa gag gcc caa tca gaa gac ctg 6424  
Arg Trp Pro Arg Thr Pro Lys Glu Glu Ala Gln Ser Leu Glu Asp Leu  
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gcc ggc ttc aaa gag ctc ttc cag aca cca gac cac act gag gaa tca 6472  
Ala Gly Phe Lys Glu Leu Phe Gln Thr Pro Asp His Thr Glu Glu Ser  
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Thr Thr Asp Asp Lys Thr Thr Lys Ile Ala Cys Lys Ser Pro Pro Pro  
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Gln Pro Leu Glu Asp Leu Ala Gly Leu Lys Glu Leu Phe Gln Thr Pro  
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Cys Arg Ser Pro Gln Pro Asp Pro Val Gly Thr Pro Thr Ile Phe Lys  
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2240 2245 2250

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2255 2260 2265

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Pro Lys Pro Ala Gly Gly Asp Glu Lys Asp Met Lys Ala Phe Met Gly  
2270 2275 2280

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Pro Val Asp Thr Pro Ala Ser Thr Lys Gln Arg Pro Lys Arg Asn Leu  
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2465 2470 2475

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Ser Ser Lys Gln Arg Leu Lys Ile Pro Leu Val Lys Val Asp Met Lys  
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2495 2500 2505

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Phe Lys Glu Ser Pro Lys Gln Ile Leu Asp Pro Ala Ala Ser Val Thr  
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35 40 45

Cys Lys Val Glu Ile His Glu Gln Glu Ala Ile Leu His Asn Phe Ser

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Ser Thr Asn Pro Thr Gln Val Asn Gly Ser Val Ile Asp Glu Pro Val

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Arg Leu Lys His Gly Asp Val Ile Thr Ile Ile Asp Arg Ser Phe Arg

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Tyr Glu Asn Glu Ser Leu Gln Asn Gly Arg Lys Ser Thr Glu Phe Pro  
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Arg Lys Ile Arg Glu Gln Glu Pro Ala Arg Arg Val Ser Arg Ser Ser  
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Glu Lys Leu Gly Thr Thr Ala Gly Gln Met Cys Ser Gly Leu Pro Gly  
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660 665 670

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675 680 685

Gln Arg Arg Pro Ala Thr Pro Lys Lys Pro Val Gly Glu Val His Ser  
690 695 700

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Lys Ala His Thr Glu Lys Val His Val Pro Ala Arg Pro Tyr Arg Val  
725 730 735

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Ser Gly Ile Ala Glu Met Phe Lys Thr Pro Val Lys Glu Gln Pro Gln  
755 760 765

Leu Thr Ser Thr Cys His Ile Ala Ile Ser Asn Ser Glu Asn Leu Leu  
770 775 780

Gly Lys Gln Phe Gln Gly Thr Asp Ser Gly Glu Glu Pro Leu Leu Pro  
785 790 795 800

Thr Ser Glu Ser Phe Gly Gly Asn Val Phe Phe Ser Ala Gln Asn Ala  
805 810 815

Ala Lys Gln Pro Ser Asp Lys Cys Ser Ala Ser Pro Pro Leu Arg Arg  
820 825 830

Gln Cys Ile Arg Glu Asn Gly Asn Val Ala Lys Thr Pro Arg Asn Thr  
835 840 845

Tyr Lys Met Thr Ser Leu Glu Thr Lys Thr Ser Asp Thr Glu Thr Glu  
850 855 860

Pro Ser Lys Thr Val Ser Thr Val Asn Arg Ser Gly Arg Ser Thr Glu  
865 870 875 880

Phe Arg Asn Ile Gln Lys Leu Pro Val Glu Ser Lys Ser Glu Glu Thr  
885 890 895

Asn Thr Glu Ile Val Glu Cys Ile Leu Lys Arg Gly Gln Lys Ala Thr  
900 905 910

Leu Leu Gln Gln Arg Arg Glu Gly Glu Met Lys Glu Ile Glu Arg Pro  
915 920 925

Phe Glu Thr Tyr Lys Glu Asn Ile Glu Leu Lys Glu Asn Asp Glu Lys  
930 935 940

Met Lys Ala Met Lys Arg Ser Arg Thr Trp Gly Gln Lys Cys Ala Pro  
945 950 955 960

Met Ser Asp Leu Thr Asp Leu Lys Ser Leu Pro Asp Thr Glu Leu Met  
965 970 975

Lys Asp Thr Ala Arg Gly Gln Asn Leu Leu Gln Thr Gln Asp His Ala  
980 985 990

Lys Ala Pro Lys Ser Glu Lys Gly Lys Ile Thr Lys Met Pro Cys Gln  
995 1000 1005

Ser Leu Gln Pro Glu Pro Ile Asn Thr Pro Thr His Thr Lys Gln Gln  
1010 1015 1020

Leu Lys Ala Ser Leu Gly Lys Val Gly Val Lys Glu Glu Leu Leu Ala  
1025 1030 1035 1040

Val Gly Lys Phe Thr Arg Thr Ser Gly Glu Thr Thr His Thr His Arg  
1045 1050 1055

Glu Pro Ala Gly Asp Gly Lys Ser Ile Arg Thr Phe Lys Glu Ser Pro  
1060 1065 1070

Lys Gln Ile Leu Asp Pro Ala Ala Arg Val Thr Gly Met Lys Lys Trp  
1075 1080 1085

Pro Arg Thr Pro Lys Glu Glu Ala Gln Ser Leu Glu Asp Leu Ala Gly  
1090 1095 1100



Phe Lys Glu Leu Phe Gln Thr Pro Gly Pro Ser Glu Glu Ser Met Thr  
1105                    1110                    1115                    1120

Asp Glu Lys Thr Thr Lys Ile Ala Cys Lys Ser Pro Pro Pro Glu Ser  
                  1125                    1130                    1135

Val Asp Thr Pro Thr Ser Thr Lys Gln Trp Pro Lys Arg Ser Leu Arg  
                  1140                    1145                    1150

Lys Ala Asp Val Glu Glu Glu Phe Leu Ala Leu Arg Lys Leu Thr Pro  
                  1155                    1160                    1165

Ser Ala Gly Lys Ala Met Leu Thr Pro Lys Pro Ala Gly Gly Asp Glu  
                  1170                    1175                    1180

Lys Asp Ile Lys Ala Phe Met Gly Thr Pro Val Gln Lys Leu Asp Leu  
1185                    1190                    1195                    1200

Ala Gly Thr Leu Pro Gly Ser Lys Arg Gln Leu Gln Thr Pro Lys Glu  
                  1205                    1210                    1215

Lys Ala Gln Ala Leu Glu Asp Leu Ala Gly Phe Lys Glu Leu Phe Gln  
                  1220                    1225                    1230

Thr Pro Gly His Thr Glu Glu Leu Val Ala Ala Gly Lys Thr Thr Lys  
                  1235                    1240                    1245

Ile Pro Cys Asp Ser Pro Gln Ser Asp Pro Val Asp Thr Pro Thr Ser  
                  1250                    1255                    1260

Thr Lys Gln Arg Pro Lys Arg Ser Ile Arg Lys Ala Asp Val Glu Gly  
1265                    1270                    1275                    1280

Glu Leu Leu Ala Cys Arg Asn Leu Met Pro Ser Ala Gly Lys Ala Met  
                  1285                    1290                    1295

His Thr Pro Lys Pro Ser Val Gly Glu Glu Lys Asp Ile Ile Ile Phe  
                  1300                    1305                    1310

Val Gly Thr Pro Val Gln Lys Leu Asp Leu Thr Glu Asn Leu Thr Gly  
                  1315                    1320                    1325

Ser Lys Arg Arg Pro Gln Thr Pro Lys Glu Glu Ala Gln Ala Leu Glu  
                  1330                    1335                    1340

Asp Leu Thr Gly Phe Lys Glu Leu Phe Gln Thr Pro Gly His Thr Glu  
1345                    1350                    1355                    1360

Glu Ala Val Ala Ala Gly Lys Thr Thr Lys Met Pro Cys Glu Ser Ser  
1365 1370 1375

Pro Pro Glu Ser Ala Asp Thr Pro Thr Ser Thr Arg Arg Gln Pro Lys  
1380 1385 1390

Thr Pro Leu Glu Lys Arg Asp Val Gln Lys Glu Leu Ser Ala Leu Lys  
1395 1400 1405

Lys Leu Thr Gln Thr Ser Gly Glu Thr Thr His Thr Asp Lys Val Pro  
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Gly Gly Glu Asp Lys Ser Ile Asn Ala Phe Arg Glu Thr Ala Lys Gln  
1425 1430 1435 1440

Lys Leu Asp Pro Ala Ala Ser Val Thr Gly Ser Lys Arg His Pro Lys  
1445 1450 1455

Thr Lys Glu Lys Ala Gln Pro Leu Glu Asp Leu Ala Gly Trp Lys Glu  
1460 1465 1470

Leu Phe Gln Thr Pro Val Cys Thr Asp Lys Pro Thr Thr His Glu Lys  
1475 1480 1485

Thr Thr Lys Ile Ala Cys Arg Ser Gln Pro Asp Pro Val Asp Thr Pro  
1490 1495 1500

Thr Ser Ser Lys Pro Gln Ser Lys Arg Ser Leu Arg Lys Val Asp Val  
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Glu Glu Glu Phe Phe Ala Leu Arg Lys Arg Thr Pro Ser Ala Gly Lys  
1525 1530 1535

Ala Met His Thr Pro Lys Pro Ala Val Ser Gly Glu Lys Asn Ile Tyr  
1540 1545 1550

Ala Phe Met Gly Thr Pro Val Gln Lys Leu Asp Leu Thr Glu Asn Leu  
1555 1560 1565

Thr Gly Ser Lys Arg Arg Leu Gln Thr Pro Lys Glu Lys Ala Gln Ala  
1570 1575 1580

Leu Glu Asp Leu Ala Gly Phe Lys Glu Leu Phe Gln Thr Arg Gly His  
1585 1590 1595 1600

Thr Glu Glu Ser Met Thr Asn Asp Lys Thr Ala Lys Val Ala Cys Lys  
1605 1610 1615

Ser Ser Gln Pro Asp Leu Asp Lys Asn Pro Ala Ser Ser Lys Arg Arg  
1620 1625 1630

Leu Lys Thr Ser Leu Gly Lys Val Gly Val Lys Glu Glu Leu Leu Ala  
1635 1640 1645

Val Gly Lys Leu Thr Gln Thr Ser Gly Glu Thr Thr His Thr His Thr  
1650 1655 1660

Glu Pro Thr Gly Asp Gly Lys Ser Met Lys Ala Phe Met Glu Ser Pro  
1665 1670 1675 1680

Lys Gln Ile Leu Asp Ser Ala Ala Ser Leu Thr Gly Ser Lys Arg Gln  
1685 1690 1695

Leu Arg Thr Pro Lys Gly Lys Ser Glu Val Pro Glu Asp Leu Ala Gly  
1700 1705 1710

Phe Ile Glu Leu Phe Gln Thr Pro Ser His Thr Lys Glu Ser Met Thr  
1715 1720 1725

Asn Glu Lys Thr Thr Lys Val Ser Tyr Arg Ala Ser Gln Pro Asp Leu  
1730 1735 1740

Val Asp Thr Pro Thr Ser Ser Lys Pro Gln Pro Lys Arg Ser Leu Arg  
1745 1750 1755 1760

Lys Ala Asp Thr Glu Glu Glu Phe Leu Ala Phe Arg Lys Gln Thr Pro  
1765 1770 1775

Ser Ala Gly Lys Ala Met His Thr Pro Lys Pro Ala Val Gly Glu Glu  
1780 1785 1790

Lys Asp Ile Asn Thr Phe Leu Gly Thr Pro Val Gln Lys Leu Asp Gln  
1795 1800 1805

Pro Gly Asn Leu Pro Gly Ser Asn Arg Arg Leu Gln Thr Arg Lys Glu  
1810 1815 1820

Lys Ala Gln Ala Leu Glu Glu Leu Thr Gly Phe Arg Glu Leu Phe Gln  
1825 1830 1835 1840

Thr Pro Cys Thr Asp Asn Pro Thr Ala Asp Glu Lys Thr Thr Lys Lys  
1845 1850 1855

Ile Leu Cys Lys Ser Pro Gln Ser Asp Pro Ala Asp Thr Pro Thr Asn  
1860 1865 1870

Thr Lys Gln Arg Pro Lys Arg Ser Leu Lys Lys Ala Asp Val Glu Glu  
1875 1880 1885

Glu Phe Leu Ala Phe Arg Lys Leu Thr Pro Ser Ala Gly Lys Ala Met  
1890 1895 1900

His Thr Pro Lys Ala Ala Val Gly Glu Glu Lys Asp Ile Asn Thr Phe  
1905 1910 1915 1920

Val Gly Thr Pro Val Glu Lys Leu Asp Leu Leu Gly Asn Leu Pro Gly  
1925 1930 1935

Ser Lys Arg Arg Pro Gln Thr Pro Lys Glu Lys Ala Lys Ala Leu Glu  
1940 1945 1950

Asp Leu Ala Gly Phe Lys Glu Leu Phe Gln Thr Pro Gly His Thr Glu  
1955 1960 1965

Glu Ser Met Thr Asp Asp Lys Ile Thr Glu Val Ser Cys Lys Ser Pro  
1970 1975 1980

Gln Pro Asp Pro Val Lys Thr Pro Thr Ser Ser Lys Gln Arg Leu Lys  
1985 1990 1995 2000

Ile Ser Leu Gly Lys Val Gly Val Lys Glu Glu Val Leu Pro Val Gly  
2005 2010 2015

Lys Leu Thr Gln Thr Ser Gly Lys Thr Thr Gln Thr His Arg Glu Thr  
2020 2025 2030

Ala Gly Asp Gly Lys Ser Ile Lys Ala Phe Lys Glu Ser Ala Lys Gln  
2035 2040 2045

Met Leu Asp Pro Ala Asn Tyr Gly Thr Gly Met Glu Arg Trp Pro Arg  
2050 2055 2060

Thr Pro Lys Glu Glu Ala Gln Ser Leu Glu Asp Leu Ala Gly Phe Lys  
2065 2070 2075 2080

Glu Leu Phe Gln Thr Pro Asp His Thr Glu Glu Ser Thr Thr Asp Asp  
2085 2090 2095

Lys Thr Thr Lys Ile Ala Cys Lys Ser Pro Pro Pro Glu Ser Met Asp  
2100 2105 2110

Thr Pro Thr Ser Thr Arg Arg Arg Pro Lys Thr Pro Leu Gly Lys Arg  
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Asp Ile Val Glu Glu Leu Ser Ala Leu Lys Gln Leu Thr Gln Thr Thr  
2130 2135 2140

His Thr Asp Lys Val Pro Gly Asp Glu Asp Lys Gly Ile Asn Val Phe  
2145 2150 2155 2160

Arg Glu Thr Ala Lys Gln Lys Leu Asp Pro Ala Ala Ser Val Thr Gly  
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Ser Lys Arg Gln Pro Arg Thr Pro Lys Gly Lys Ala Gln Pro Leu Glu  
2180 2185 2190

Asp Leu Ala Gly Leu Lys Glu Leu Phe Gln Thr Pro Val Cys Thr Asp  
2195 2200 2205

Lys Pro Thr Thr His Glu Lys Thr Thr Lys Ile Ala Cys Arg Ser Pro  
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Gln Pro Asp Pro Val Gly Thr Pro Thr Ile Phe Lys Pro Gln Ser Lys  
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Arg Ser Leu Arg Lys Ala Asp Val Glu Glu Glu Ser Leu Ala Leu Arg  
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Lys Arg Thr Pro Ser Val Gly Lys Ala Met Asp Thr Pro Lys Pro Ala  
2260 2265 2270

Gly Gly Asp Glu Lys Asp Met Lys Ala Phe Met Gly Thr Pro Val Gln  
2275 2280 2285

Lys Leu Asp Leu Pro Gly Asn Leu Pro Gly Ser Lys Arg Trp Pro Gln  
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Thr Pro Lys Glu Lys Ala Gln Ala Leu Glu Asp Leu Ala Gly Phe Lys  
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Glu Leu Phe Gln Thr Pro Gly Thr Asp Lys Pro Thr Thr Asp Glu Lys  
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Thr Thr Lys Ile Ala Cys Lys Ser Pro Gln Pro Asp Pro Val Asp Thr  
2340 2345 2350

Pro Ala Ser Thr Lys Gln Arg Pro Lys Arg Asn Leu Arg Lys Ala Asp  
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Val Glu Glu Glu Phe Leu Ala Leu Arg Lys Arg Thr Pro Ser Ala Gly  
2370 2375 2380

Lys Ala Met Asp Thr Pro Lys Pro Ala Val Ser Asp Glu Lys Asn Ile  
2385                    2390                    2395                    2400

Asn Thr Phe Val Glu Thr Pro Val Gln Lys Leu Asp Leu Leu Gly Asn  
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Leu Pro Gly Ser Lys Arg Gln Pro Gln Thr Pro Lys Glu Lys Ala Glu  
                  2420                    2425                    2430

Ala Leu Glu Asp Leu Val Gly Phe Lys Glu Leu Phe Gln Thr Pro Gly  
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His Thr Glu Glu Ser Met Thr Asp Asp Lys Ile Thr Glu Val Ser Cys  
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Lys Ser Pro Gln Pro Glu Ser Phe Lys Thr Ser Arg Ser Ser Lys Gln  
2465                    2470                    2475                    2480

Arg Leu Lys Ile Pro Leu Val Lys Val Asp Met Lys Glu Glu Pro Leu  
                  2485                    2490                    2495

Ala Val Ser Lys Leu Thr Arg Thr Ser Gly Glu Thr Thr Gln Thr His  
                  2500                    2505                    2510

Thr Glu Pro Thr Gly Asp Ser Lys Ser Ile Lys Ala Phe Lys Glu Ser  
                  2515                    2520                    2525

Pro Lys Gln Ile Leu Asp Pro Ala Ala Ser Val Thr Gly Ser Arg Arg  
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Gln Leu Arg Thr Arg Lys Glu Lys Ala Arg Ala Leu Glu Asp Leu Val  
2545                    2550                    2555                    2560

Asp Phe Lys Glu Leu Phe Ser Ala Pro Gly His Thr Glu Glu Ser Met  
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Thr Ile Asp Lys Asn Thr Lys Ile Pro Cys Lys Ser Pro Pro Pro Glu  
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Thr Ser Gly Gln Ser Thr His Thr His Lys Glu Pro Ala Ser Gly Asp  
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Val Glu Glu Glu Pro Ser Arg Arg Arg Pro Arg Ala Pro Lys Glu Lys  
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Ala Gln Pro Leu Glu Asp Leu Ala Gly Phe Thr Glu Leu Ser Glu Thr  
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Ser Gly His Thr Gln Glu Ser Leu Thr Ala Gly Lys Ala Thr Lys Ile  
2690 2695 2700

Pro Cys Glu Ser Pro Pro Leu Glu Val Val Asp Thr Thr Ala Ser Thr  
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Lys Arg His Leu Arg Thr Arg Val Gln Lys Val Gln Val Lys Glu Glu  
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Pro Ser Ala Val Lys Phe Thr Gln Thr Ser Gly Glu Thr Thr Asp Ala  
2740 2745 2750

Asp Lys Glu Pro Ala Gly Glu Asp Lys Gly Ile Lys Ala Leu Lys Glu  
2755 2760 2765

Ser Ala Lys Gln Thr Pro Ala Pro Ala Ala Ser Val Thr Gly Ser Arg  
2770 2775 2780

Arg Arg Pro Arg Ala Pro Arg Glu Ser Ala Gln Ala Ile Glu Asp Leu  
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Asp Thr Ala Thr Ser Ser Lys Arg Arg Pro Arg Thr Arg Ala Gln Lys  
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Gln Pro Leu Glu Asp Leu Ala Ser Phe Gln Glu Leu Ser Gln Thr Pro  
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Gly His Thr Glu Glu Leu Ala Asn Gly Ala Ala Asp Ser Phe Thr Ser  
2930 2935 2940

Ala Pro Lys Gln Thr Pro Asp Ser Gly Lys Pro Leu Lys Ile Ser Arg  
2945 2950 2955 2960

Arg Val Leu Arg Ala Pro Lys Val Glu Pro Val Gly Asp Val Val Ser  
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Thr Arg Asp Pro Val Lys Ser Gln Ser Lys Ser Asn Thr Ser Leu Pro  
2980 2985 2990

Pro Leu Pro Phe Lys Arg Gly Gly Gly Lys Asp Gly Ser Val Thr Gly  
2995 3000 3005

Thr Lys Arg Leu Arg Cys Met Pro Ala Pro Glu Glu Ile Val Glu Glu  
3010 3015 3020

Leu Pro Ala Ser Lys Lys Gln Arg Val Ala Pro Arg Ala Arg Gly Lys  
3025 3030 3035 3040

Ser Ser Glu Pro Val Val Ile Met Lys Arg Ser Leu Arg Thr Ser Ala  
3045 3050 3055

Lys Arg Ile Glu Pro Ala Glu Glu Leu Asn Ser Asn Asp Met Lys Thr  
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Asn Lys Glu Glu His Lys Leu Gln Asp Ser Val Pro Glu Asn Lys Gly  
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Ile Ser Leu Arg Ser Arg Arg Gln Asp Lys Thr Glu Ala Glu Gln Gln  
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Ile Thr Glu Val Phe Val Leu Ala Glu Arg Ile Glu Ile Asn Arg Asn  
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Glu Lys Lys Pro Met Lys Thr Ser Pro Glu Met Asp Ile Gln Asn Pro  
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Asp Asp Gly Ala Arg Lys Pro Ile Pro Arg Asp Lys Val Thr Glu Asn  
3140 3145 3150



Lys Arg Cys Leu Arg Ser Ala Arg Gln Asn Glu Ser Ser Gln Pro Lys  
3155 3160 3165

Val Ala Glu Glu Ser Gly Gly Gln Lys Ser Ala Lys Val Leu Met Gln  
3170 3175 3180

Asn Gln Lys Gly Lys Gly Glu Ala Gly Asn Ser Asp Ser Met Cys Leu  
3185 3190 3195 3200

Arg Ser Arg Lys Thr Lys Ser Gln Pro Ala Ala Ser Thr Leu Glu Ser  
3205 3210 3215

Lys Ser Val Gln Arg Val Thr Arg Ser Val Lys Arg Cys Ala Glu Asn  
3220 3225 3230

Pro Lys Lys Ala Glu Asp Asn Val Cys Val Lys Lys Ile Thr Thr Arg  
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<223> Description of the artificial sequence:

Synthetic oligonucleotide

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